FAA-E-2363
August 8, 1968

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION SPECIFICATION

TUBE, VIDICON CAMERA PICKUP (BRITE)

1. SCOPE

1.1 Scope.- This specification sets forth the requirements for a one inch separate mesh vidicon with special long persistence characteristics to be used in the Bright Radar Indicator - Tower Equipment (BRITE) as specified in FAA-E-2360.

2. APPLICABLE DOCUMENTS

2.1 FAA specifications.- The following FAA specification of the issue specified in the Request for Proposals or Invitation for Bids, forms a part of this specification, to the extent specified herein:

FAA-E-2360	Indicator, Bright, Radar Tower Equipment (BRITE) - (For information purposes)

(Copies of this specification and other applicable FAA specifications may be obtained from Federal Aviation Administration, Washington, D. C. 20590, ATTN: Contracting Officer. Requests should fully identify material desired, i.e., specification and amendment numbers and dates. Requests should cite the Invitation for Bids, Request for Proposals, or the contract involved, or other use to be made of the requested material.)

2.2 Military specifications.- The following Military specification, of the issue in effect on date of the Request for Proposals or Invitation for Bids forms a part of this specification, to the extent specified herein:

MIL-E-17555 Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of

(Single copies of Military specifications may be obtainable from Federal Aviation Administration, Washington, D. C. 20590, ATTN: Contracting Officer; mail requests should cite the Invitation for Bids, Request for Proposals, or contract for which each specification or amendment is needed. Specifications on the above list not needed for the cited purpose should be omitted from requests. Requests should be based on current requirements, as no mailing lists are maintained. Note that mail requests (if found acceptable) will be forwarded to a Military supply depot for filling, hence ample time should be allowed.)

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each vidicon furnished shall conform to all specification requirements.

3.2 Description.-

(a) Focusing method - magnetic

(b) Deflection method - magnetic

(c) Operating position - any

(d) Aspect ratio - 1:1

3.2.1 Dimensions and pin connections.- Dimensions and pin connections for the vidicon shall be as shown in Figure 2.

3.2.2 Operating scan parameters.- The vidicon will be used in a 945 line TV camera, 28,350 lines per second, 30 frames per second, 2:1 interlace.

3.2.3 Minimum useful area.- The useful quality area shall be a circle whose diameter is 0.625 inches.

3.2.4 Orientation of image.- Horizontal scan shall be parallel to a plane passing through the tube axis and the short index pin.

3.3 Ratings.- Ratings shall be as listed below. All voltages are with respect to the cathode with the exception of the heater voltage.

Parameter	Maximum	Minimum	Operating Conditions
Heater voltage (Ef) RMS	6.9 V	5.7 V	6.3 V
Target voltage (Esj)	100 vdc	---	Adj 15 to 65 vdc
Target dark current (DISj)	0.25uAdc	---	Adj
Peak target current (IsjT)	0.55uA	---	Adj
Grid 4 voltage (Ec_4)	1,000 vdc	---	750 vdc
Grid 3 voltage (Ec_3)	750 vdc	---	450 vdc
Grid 2 voltage (Ec_2)	350 vdc	---	300 vdc
Grid 1 voltage (Ec_1)	-150 vdc	0	Adj
Illumination on face plate	1,000 foot candles	---	Var
Face plate temp (Tf)	71° C	0°	30° C to 35° C
Storage temp	125° C	---	---
Grid 4 to grid 3	600 vdc	---	---
Heater cathode voltage (Ehk)	-125 vdc	+10 vdc	---

3.3.1 Heater current.- At a heater voltage of 6.3 V, the heater current (If) shall be 0.1 amps ±10%.

3.3.2 Inter-electrode capacitance.- The capacitance between the signal electrode and all other electrodes shall be a maximum of 3.1 uuf.

3.3.3 Signal output current.- Signal output current is the signal current minus dark current. The minimum acceptable value is 0.15 microamps with 0.1 FC on the target face plate.

3.4 Vidicon decay characteristics.- With no light on the vidicon, the target voltage shall be adjusted to provide .02 uAmp dark current. The tube shall then be exposed to the test pattern shown in Figure 1 and the iris adjusted to give 0.22 uAmp total target current (0.2 uAmp signal). The video amplitude shall be viewed at a very slow 30 second rate on a Tektronics 545 oscilloscope or equivalent. Signal level from the test pattern shall be set to 5 cm (100%) and the capped up (black) signal level set to zero cm (0%).

The vidicon shall be exposed to the white light for at least enough time to stabilize the video signal at the 100% point but exposure should not exceed 15 seconds to avoid pattern burn-in. At time zero of the oscilloscope sweep, the vidicon lens will be shuttered or capped up.

The resultant signal decay curve will be observed on the oscilloscope, and shall conform to the following:

Time	Signal Level
0	Initial signal level
1 second	45% min. - 65% max.
4 seconds	At least 25% of initial signal level
15 seconds	At least 10% of initial signal level
30 seconds	No more than 10% of initial signal level

3.5 Gamma.- The average gamma of the transfer characteristic over a signal output current range of .05 to 0.2 uA shall be a minimum of 0.7 and a maximum of 0.8.

3.6 Scanned area.- With a 1:1 aspect ratio, a rectangular scan shall scan a square whose sides are equal to 0.625 inches. The useful area within this scanned raster shall be an inscribed circle whose diameter is 0.625 inches.

3.7 Resolution.- The resolution at the center of the vidicon shall be a minimum of 900 TV lines with 50% modulation.

3.8 Erasure of vidicon.- The vidicon shall be capable of being erased to visual extinction and primed in no more than four seconds. The method of erase shall be by flashing the face plate with light and increasing the beam current to maximum to accomplish prime.

3.9 Spurious signal test.- A uniformly diffused white test pattern separated into two zones as shown in Figure 1 shall be used for this test. With no light on the vidicon, the target voltage shall be adjusted for a dark current of 0.1 uA. The vidicon shall then be focused on the test pattern and the light adjusted by means of the lens iris to provide 0.2 uA target current (0.1 uAmp signal). The target area is then inspected for spots and blemishes which have a contrast ratio greater than 1.5:1. Tubes shall be rejected when spots appear which exceed the allowable number in a given size range as defined in the following table. (Monitor raster size is adjusted to 8 1/8 inches by 8 1/8 inches for measurement.)

Allowable Spot Size (Inches)	Number in Zone 1
Over 0.065	None
0.065 to but not including 0.050	1
0.050 to but not including 0.015	4
0.015 and under	*

* Do not count spots of this size unless concentration causes a smudge appearance. Minimum separation between any two spots larger than .015 inches is limited to 1/4 inch.

Tubes will also be rejected for smudges, streaks or mottled and grainy background when they exceed 10% of the normal (0.3 uA) peak signal amplitude. Any number of spots and blemishes are permitted in Zone 2.

4. QUALITY ASSURANCE PROVISIONS.- The contractor shall provide and maintain a quality control program which fulfills the requirements of Military Specification, MIL-I-45208A, Inspection System Requirements. The contractor's quality program shall be a scheduled and disciplined plan of events integrating all necessary inspections and tests required to substantiate produce quality during design, development, purchasing, subcontracting, manufacture, fabrication, processes, assembly, acceptance, packaging, and shipping. The contractor shall perform or have performed all inspections and tests required to substantiate product configuration and conformance to drawings, specifications and contract requirements and shall perform or have performed all inspections and tests otherwise required by the contract. An FAA Representative will witness the contractor's testing and inspections and will perform such visual and other inspections as deemed necessary to assure compliance with contract requirements unless such FAA witnessing requirement is waived by the contracting officer. If such requirement is waived, the contractor shall furnish certified test data establishing proof of compliance with specification requirements. A test data sheet following the format below, is required with each vidicon delivered.

Vidicon Test Data

Horizontal alignment	_____ma
Vertical alignment	_____ma
Target volts for I_d = .020 uA	_____volts
Signal current for 0.1 F.C., I_d = .02 uA	_____uAmp
Beam cutoff	_____volts
Center resolution (limiting)	_____TV lines
Amplitude response at 400 TV lines	_____%
Lag (1/20 second)	_____%
Lag (1 second)	_____%
Lag (15 seconds)	_____%
Lag (30 seconds)	_____%

Maximum grid 2 current (zero bias) _____ ma

Mottling at I_d = 0.1 uAmp _____ %*

I_d = .02 uAmp _____ %

Spots and blemishes

No. of Spots_____ Size _____ Location_____

Spots: .040 inch, all near outer edges of scanned area

Blemishes: Less than 1.5:1 contrast ratio

Location_____

Gas ratio: .02 nA/uA

*Measured as percent of a black-to-white transition of 0.30 uA.

5. PREPARATION FOR DELIVERY.- The equipment shall be prepared for delivery in accordance with MIL-E-17555.

6. NOTES.- None.

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FOR FIGURES 1 AND 2, SEE PAGES 7 AND 8

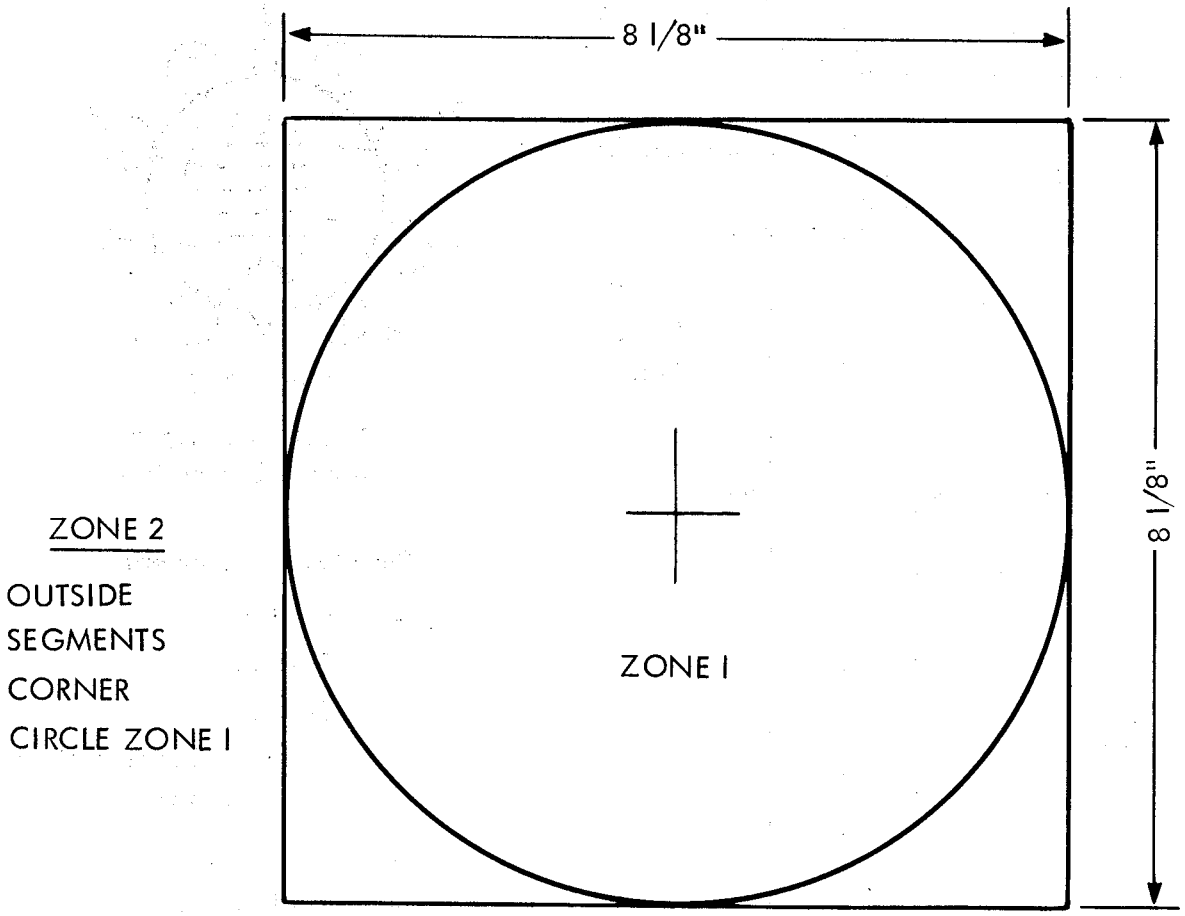
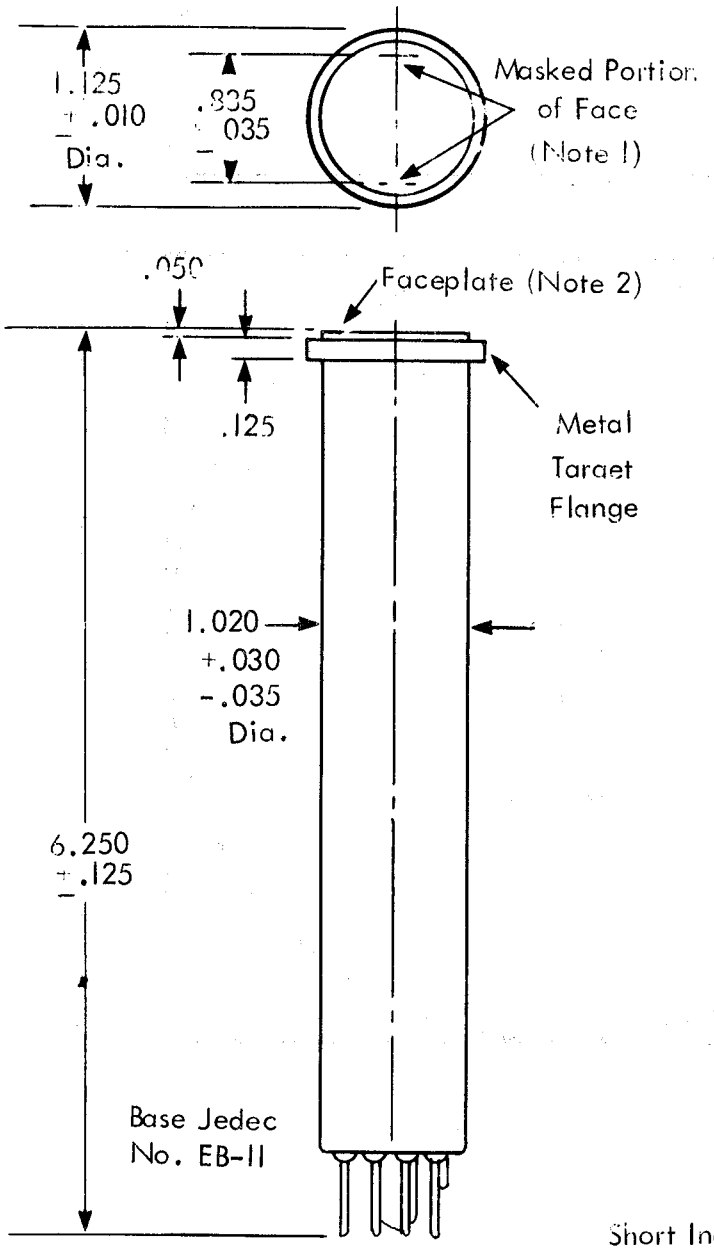
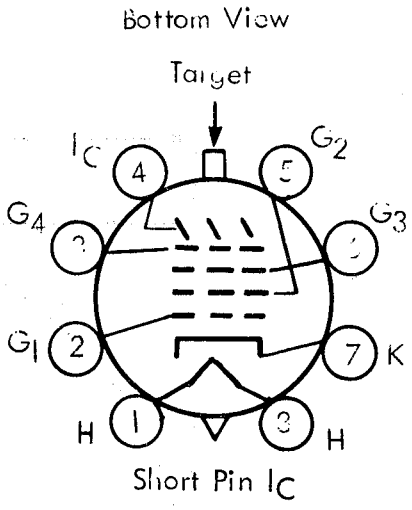


FIGURE 1 SPURIOUS SIGNAL TEST PATTERN

DIMENSIONAL OUTLINE



BASE DIAGRAM



Direction of Light:
Into Face End of Tube

Pin No.		Element
1	-	Heater
2	-	Grid No. 1
3	-	Grid No. 4
4	-	Internal Connection -- Do Not Use
5	-	Grid No. 2
6	-	Grid No. 3
7	-	Cathode
8	-	Heater
Flange	-	Target
Short Index Pin	-	Internal Connection -- Make No Connection

NOTE 1: Straight sides of Masked portions are parallel to the plane passing through tube axis and short index pin.

2: Faceplate thickness is 0.094" ± 0.012".

3: All dimensions are in inches.

FIGURE 2. VIDICON DIMENSIONS AND BASE DIAGRAM

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